

INFO PRESSE

"Mathematical Study of an Hyperbolic Regularization to Ensure Gauss' Law Conservation in Maxwell-Vlasov Applications "

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Abstract :

This paper studies an hyperbolic modification of Maxwell's equations to ensure Gauss' law.

This correction was obtained by adding a parameter dependent new unknown and is of great interest for the numerical simulation in plasma physics since the discretization of the Maxwell-Vlasov system does not grant straightforwardly the physical conservation of the charge. Such problems are encountered while using Particle-In-Cell schemes.

In this paper the new proposed system has the interest of still being a Friedrichs' one.

Its asymptotic behaviour with respect to the parameter and the link between modified and original Maxwell's systems are thus investigated.

At last, we look for some boundary conditions, granting the well-posedness of the system.

Generalizations of the Silver-Müller condition, perfect electric and magnetic conductors, as well as impedance and admittance representation of materials are detailed.

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